

AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended) Apparatus for blow moulding hollow plastic containers, comprising:

- a plurality of pairs of openable and closable half-moulds capable of being coupled to each other and clamped together, said pairs being associated to an appropriate central structure,

- devices to handle, transfer and introduce the preforms in said corresponding half-moulds as these are kept in their open position,

- a pick-up device adapted to remove the blow-moulded container from the pair of half-moulds upon them being opened, ie. separated,

- a mould opening and closing mechanism adapted to close, ie. clamp said half-moulds together upon them having passed through the position in which preform insertion is carried out, and to open, ~~ie. separate~~ said half-moulds from each other in correspondence of the mechanism provided to remove the finished container therefrom,

- means adapted to arrange a respective preform in a pre-defined position suitable for blow moulding, and to hold it in this position regardless of the position and mutual relation of said respective pair of half-moulds, in particular when said half-moulds are at least partially open, ie. separated from each other, characterized in that said means comprise:

- a fork member (3) joined to a respective stationary half-mould (1) and provided with a receptacle (8) adapted to place the respective preform into said respective pre-defined position,

- a pincer-like gripper (5) adapted to transfer a respective preform (7) from an external position and automatically fit it into said receptacle (8) of the respective fork member (3), as well as to automatically disengage from said preform upon the latter having been firmly fitted into said respective receptacle,

- a small-tube assembly (4) adapted to move into inserting in the mouth portion (6) of said preform when the latter is so restrained in said respective receptacle (8).

Claim 2 (Previously Presented) Apparatus according to claim 1, characterized in that the locked condition of said preform is determined:

- either by it engaging said pincer-like gripper (5),

- either by it engaging said pincer-like gripper (5),
- or by the combined action of said fork member (3) and the respective small-tube assembly (4).

Claim 3 (Previously Presented) Apparatus according to claim 2, characterized in that said small-tube assembly comprises:

- a substantially cylindrical insert piece (10) adapted to firmly fit into the mouth portion of the respective preform,
- a stretching rod (11), which is provided slidably inside of said insert piece and is adapted to be displaced in a rectilinear manner into the respective preform when said respective insert piece is so firmly fitted into the mouth portion of said respective preform.

Claim 4 (Previously Presented) Apparatus according to claim 3, characterized in that said insert piece (10) is provided along its periphery with a plurality of passages or recesses (14) adapted to enable gas to flow from the outside to the inside of the respective preform when said insert piece is fully and firmly fitted and locked into the respective preform.

Claim 5 (Previously Presented) Apparatus according to claim 1, characterized in that said central structure (20), to which said pairs of half-moulds are associated, is a rotary structure on a horizontal plane, and said pairs of half-moulds are arranged, preferably regularly spaced from each other, along a circular periphery centered on the axis of rotation of said rotary structure.

Claim 6 (Previously Presented) Apparatus according to claim 5, characterized in that said pairs of half-moulds are comprised of a respective stationary half-mould (1) and a respective moving half-mould (2) capable of opening from and closing against the respective stationary half-mould.

Claim 7 (Previously Presented) Apparatus according to claim 6, characterized in that said stationary half-moulds are substantially joined to said appropriate central structure (20) and are arranged in a substantially vertical position, and the respective moving half-moulds (2) are adapted to move into clamping with a substantially rotary movement about respective horizontal axes of rotation.

Claim 8 (Previously Presented) Apparatus according to claim 7, characterized in that said horizontal axes are orthogonal to the axis of rotation of said rotary central structure.

Claim 9 (Previously Presented) Method for inserting and locking a preform in a pre-determined position of a pair of blow-moulding half-moulds, characterized in that it comprises following five phases, in which:

a) - said preform is approached to said pre-determined position by means of a respective gripper (5) adapted to engage said preform, said gripper being capable to be transferred in a controllable manner into an appropriate disposition with respect to a pre-defined one (1) of said half-moulds:

b) - said preform is locked in place with respect to an appropriate receptacle member (8) that is firmly joined to said pre-defined one (1) of said half-moulds;

c) - an appropriate small-tube assembly, which is comprised of an insert piece (10) and a respective stretching rod (11), is inserted in the mouth portion (6) of said preform;

d) - said gripper (5) automatically disengages from the respective preform;

e) - said pair of half-moulds moves into closing and clamping.

Claim 10 (Previously Presented) Method according to claim 9, characterized in that the above cited phases d) and e) are adapted to be performed at least partially at the same time.

Claim 11 (Previously Presented) Method according to claim 9, characterized in that the above cited phases c) and e) are adapted to be performed at least partially at the same time.

Claim 12 (Previously Presented) Method according to claim 9, characterized in that said rotary central structure is adapted to support a plurality of pairs of said half-moulds, and that said five phases a) to e) are performed in an automatic, continuous and orderly sequence for said plurality of pairs of said half-moulds.

Claim 13 (Previously Presented) Method according to claim 12, characterized in that the rotation period of said rotary central structure coincides with the cycle time corresponding to the steps during which

- the preform is loaded in the mould,
- the mould is closed and clamped,
- the preform is blow moulded through the various steps connected with the process,
- the mould is opened by the separation of the respective half-moulds,
- the blow-moulded product is removed therefrom.

Claim 14 (Previously Presented) Apparatus according to claim 2, characterized in that said central structure (20), to which said pairs of half-moulds are associated, is a rotary structure on a horizontal plane, and said pairs of half-moulds are arranged, preferably regularly spaced from each other, along a circular periphery centered on the axis of rotation of said rotary structure.

Claim 15 (Previously Presented) Apparatus according to claim 3, characterized in that said central structure (20), to which said pairs of half-moulds are associated, is a rotary structure on a horizontal plane, and said pairs of half-moulds are arranged, preferably regularly spaced from each other, along a circular periphery centered on the axis of rotation of said rotary structure.

Claim 16 (Previously Presented) Apparatus according to claim 4, characterized in that said central structure (20), to which said pairs of half-moulds are associated, is a rotary structure on a horizontal plane, and said pairs of half-moulds are arranged, preferably regularly spaced from each other, along a circular periphery centered on the axis of rotation of said rotary structure.

Claim 17 (Previously Presented) Apparatus according to claim 14, characterized in that said pairs of half-moulds are comprised of a respective stationary half-mould (1) and a respective moving half-mould (2) capable of opening from and closing against the respective stationary half-mould.

Claim 18 (Previously Presented) Apparatus according to claim 15, characterized in that said pairs of half-moulds are comprised of a respective stationary half-mould (1) and a respective moving half-mould (2) capable of opening from and closing against the respective stationary half-mould.

Claim 19 (Previously Presented) Apparatus according to claim 16, characterized in that said pairs of half-moulds are comprised of a respective stationary half-mould (1) and a respective moving half-mould (2) capable of opening from and closing against the respective stationary half-mould.

Claim 20 (Previously Presented) Apparatus according to claim 17, characterized in that said stationary half-moulds are substantially joined to said appropriate central structure (20) and are arranged in a substantially vertical position, and the respective moving half-moulds (2) are adapted to move into clamping with a substantially rotary movement about respective horizontal axes of rotation.

Claim 21 (Previously Presented) Apparatus according to claim 18, characterized in that said stationary half-moulds are substantially joined to said appropriate central structure (20) and are arranged in a substantially vertical position, and the respective moving half-moulds (2) are adapted to move into clamping with a substantially rotary movement about respective horizontal axes of rotation.

Claim 22 (Previously Presented) Apparatus according to claim 19, characterized in that said stationary half-moulds are substantially joined to said appropriate central structure (20) and are arranged in a substantially vertical position, and the respective moving half-moulds (2) are adapted to move into clamping with a substantially rotary movement about respective horizontal axes of rotation.

Claim 23 (Previously Presented) Apparatus according to claim 20, characterized in that said horizontal axes are orthogonal to the axis of rotation of said rotary central structure.

Claim 24 (Previously Presented) Apparatus according to claim 21, characterized in that said horizontal axes are orthogonal to the axis of rotation of said rotary central structure.

Claim 25 (Previously Presented) Apparatus according to claim 22, characterized in that said horizontal axes are orthogonal to the axis of rotation of said rotary central structure.

Claim 26 (Previously Presented) Method according to claim 10, characterized in that the above cited phases c) and e) are adapted to be performed at least partially at the same time.

Claim 27 (Previously Presented) Method according to claim 10, characterized in that said rotary central structure is adapted to support a plurality of pairs of said half-moulds, and that said five phases a) to e) are performed in an automatic, continuous and orderly sequence for said plurality of pairs of said half-moulds.

Claim 28 (Previously Presented) Method according to claim 11, characterized in that said rotary central structure is adapted to support a plurality of pairs of said half-moulds, and that said five phases a) to e) are performed in an automatic, continuous and orderly sequence for said plurality of pairs of said half-moulds.

Claim 29 (Previously Presented) Method according to claim 27, characterized in that the rotation period of said rotary central structure coincides with the cycle time corresponding to the steps during which

- the preform is loaded in the mould,
- the mould is closed and clamped,
- the preform is blow moulded through the various steps connected with the process,
- the mould is opened by the separation of the respective half-moulds,
- the blow-moulded product is removed therefrom.

Claim 30 (Previously Presented) Method according to claim 28, characterized in that the rotation period of said rotary central structure coincides with the cycle time corresponding to the steps during which

- the preform is loaded in the mould,
- the mould is closed and clamped,
- the preform is blow moulded through the various steps connected with the process,
- the mould is opened by the separation of the respective half-moulds,
- the blow-moulded product is removed therefrom.